

(12) **United States Patent**
Marr et al.

(10) **Patent No.:** **US 9,325,843 B1**
(45) **Date of Patent:** ***Apr. 26, 2016**

(54) **REAL-TIME MONITORING OF AGENT ADHERENCE**

3/5233; H04M 3/2218; H04M 2203/402;
H04M 3/5232; H04M 2201/42; H04M 3/5133;
H04M 2201/38; H04M 2203/551

(71) Applicant: **West Corporation**, Omaha, NE (US)

USPC 379/265.01-265.14
See application file for complete search history.

(72) Inventors: **Kenneth A. Marr**, Ashland, NE (US);
Joseph S. Cox, Omaha, NE (US);
Maureen A. Mahoney, Omaha, NE (US);
Mark D. Helm, Omaha, NE (US);
Michael Joseph Parmeley, Omaha, NE (US);
Brent Donald Hansen, Omaha, NE (US)

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,946,375	A	8/1999	Pattison et al.	
6,278,777	B1 *	8/2001	Morley et al.	379/265.02
6,587,556	B1	7/2003	Judkins et al.	
7,636,433	B2	12/2009	Noyan et al.	
8,160,233	B2	4/2012	Keren et al.	
2005/0075839	A1	4/2005	Rotheroe	
2006/0062376	A1	3/2006	Pickford	
2006/0159253	A1	7/2006	Fink et al.	
2006/0188085	A1	8/2006	Ricketts	
2006/0256953	A1	11/2006	Pulaski et al.	
2006/0271418	A1	11/2006	Hackbarth et al.	
2007/0206767	A1	9/2007	Keren et al.	
2008/0144803	A1	6/2008	Jaiswal et al.	
2009/0141868	A1	6/2009	Miller et al.	
2011/0072449	A1	3/2011	Ivanyi	
2013/0136252	A1	5/2013	Kosiba et al.	

(73) Assignee: **Alorica Business Solutions**, Irvine, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 52 days.

This patent is subject to a terminal disclaimer.

* cited by examiner

(21) Appl. No.: **14/167,361**

Primary Examiner — Oleg Asanbayev

(22) Filed: **Jan. 29, 2014**

Related U.S. Application Data

(63) Continuation of application No. 12/125,344, filed on May 22, 2008, now Pat. No. 8,670,553.

(51) **Int. Cl.**
H04M 3/00 (2006.01)
H04M 5/00 (2006.01)
H04M 3/51 (2006.01)

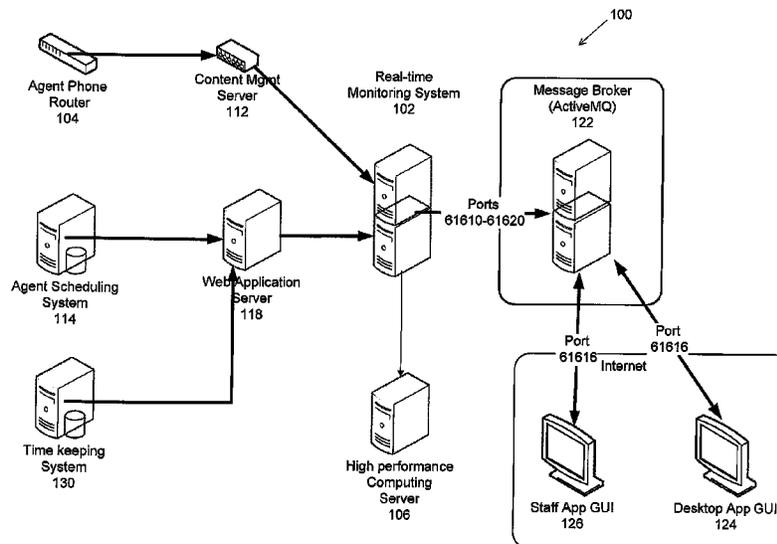
(52) **U.S. Cl.**
CPC **H04M 3/5175** (2013.01)

(58) **Field of Classification Search**
CPC H04M 3/5175; H04M 3/42221; H04M

(57) **ABSTRACT**

A method, a system, and computer readable medium comprising instructions for real-time monitoring of agent adherence. The method comprises collecting events and data for an agent from at least one phone router, collecting time keeping data from a time clock system, collecting data and events from a scheduling system, normalizing the events, data, and generating at least one user interface comprising normalized data, presenting at least one view of the at least one user interface to at least one application, and refreshing the at least one view with updated events and data.

13 Claims, 15 Drawing Sheets



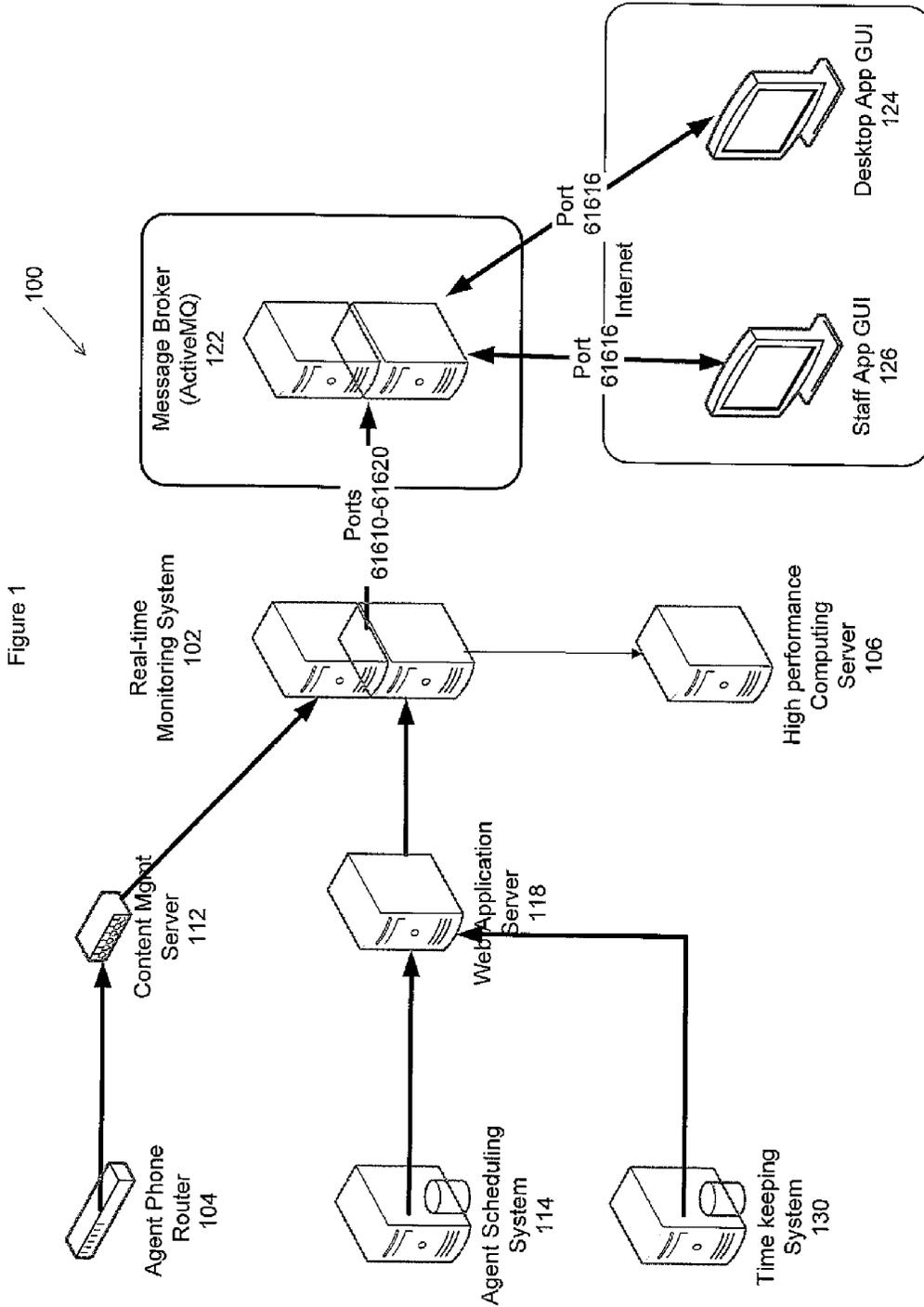
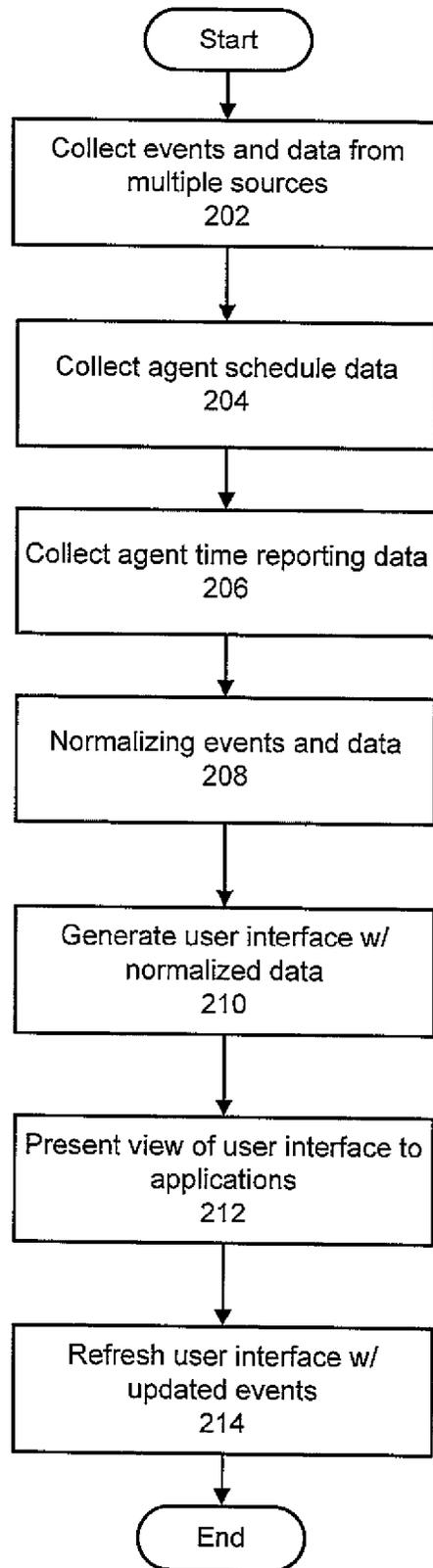


Figure 2



200

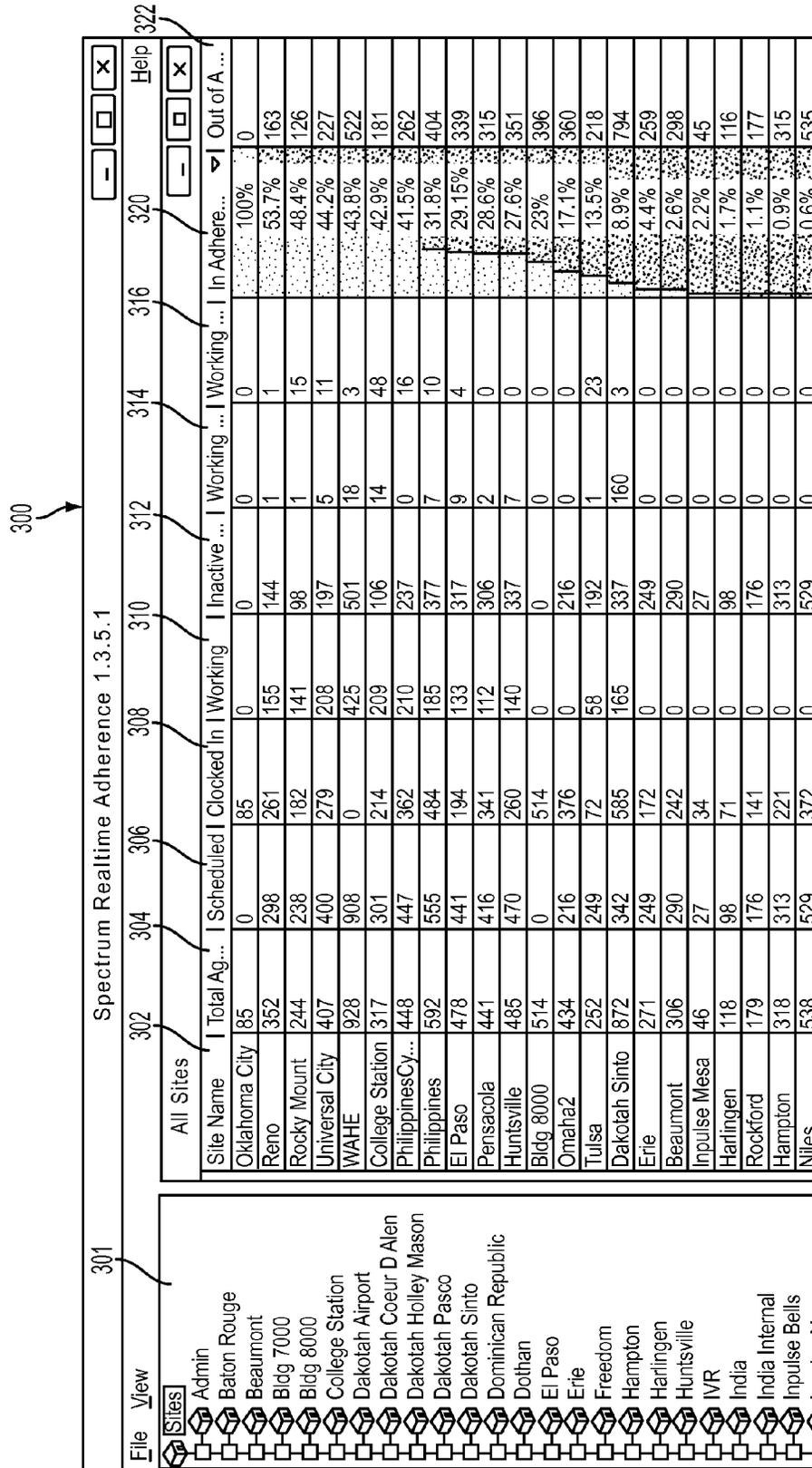


FIG. 3

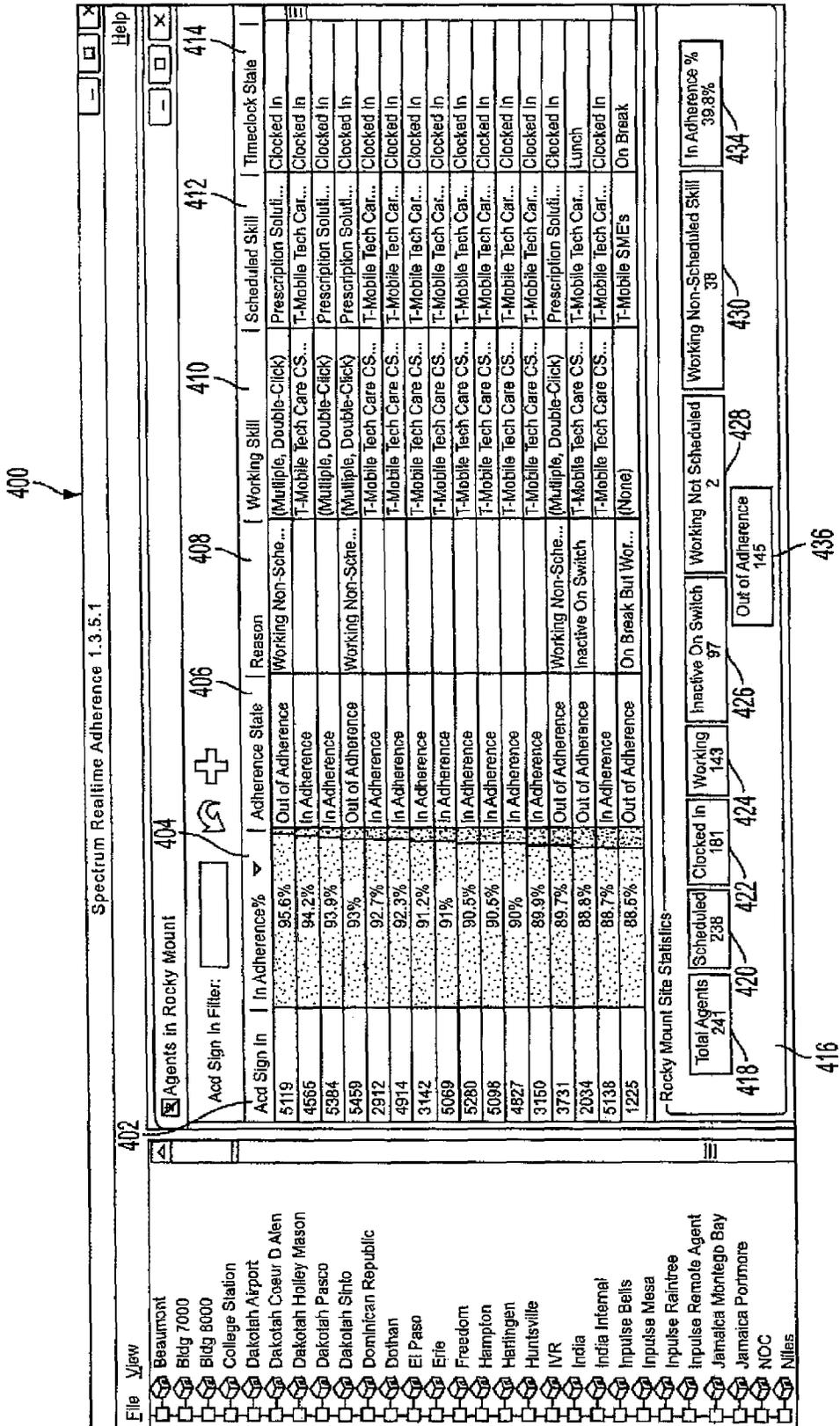


FIG. 4

500

Spectrum Realtime Adheren

File View 502

Rocky Mount

- American Red Cross
- Prescription Solutions
- Prescription Solutions PT
- RX Solutions Help Desk
- Rx Solutions Stafftime
- T-Mobile Downtime Forms
- T-Mobile General Care R
- T-Mobile PTL
- T-Mobile PTL's
- T-Mobile SME's
- T-Mobile Tech Care CS
- Temporary

San Antonio III

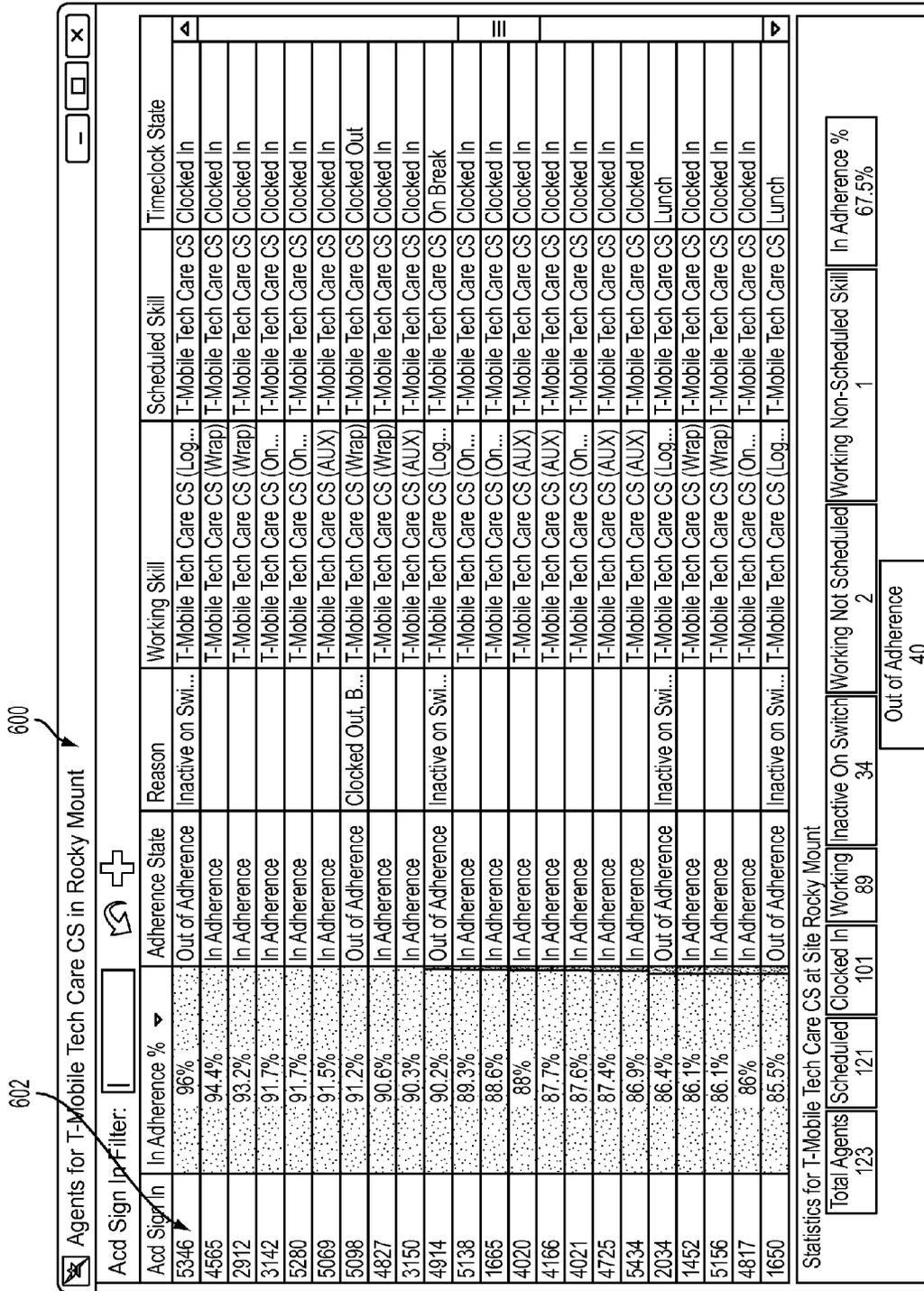
Agents in Rocky Mount

Acid Sign In Filter:

Acid Sign In	In Adherence %	Adherence State
4565	94.3%	In Adherence
5384	93.9%	Out of Adherence
5115	93.4%	Out of Adherence
2912	93%	In Adherence
5335	92.5%	Out of Adherence
4914	92.2%	Out of Adherence
3142	91.5%	In Adherence
5069	91.3%	In Adherence
5280	91.2%	In Adherence

504

FIG. 5



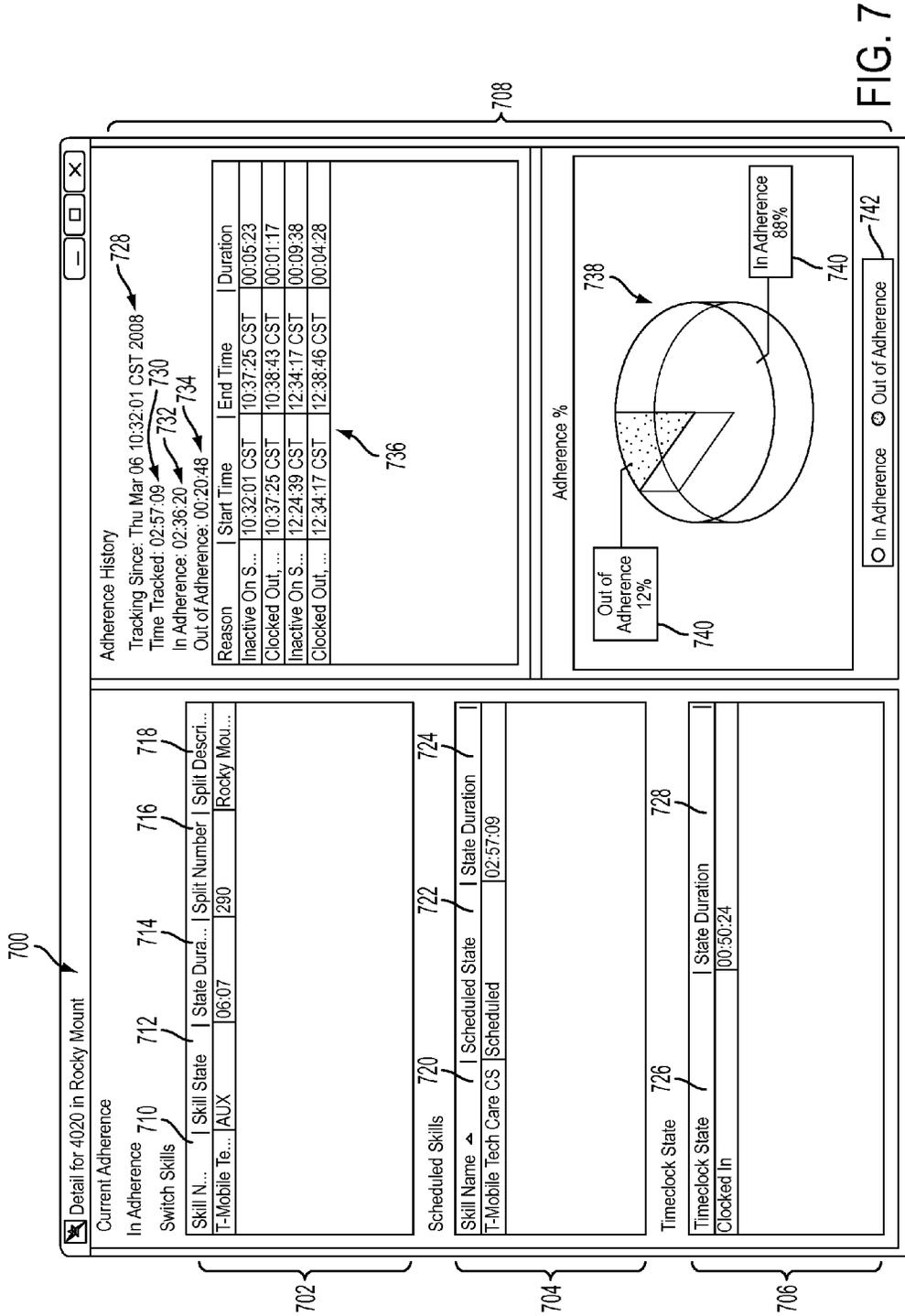


FIG. 7

800

804

802

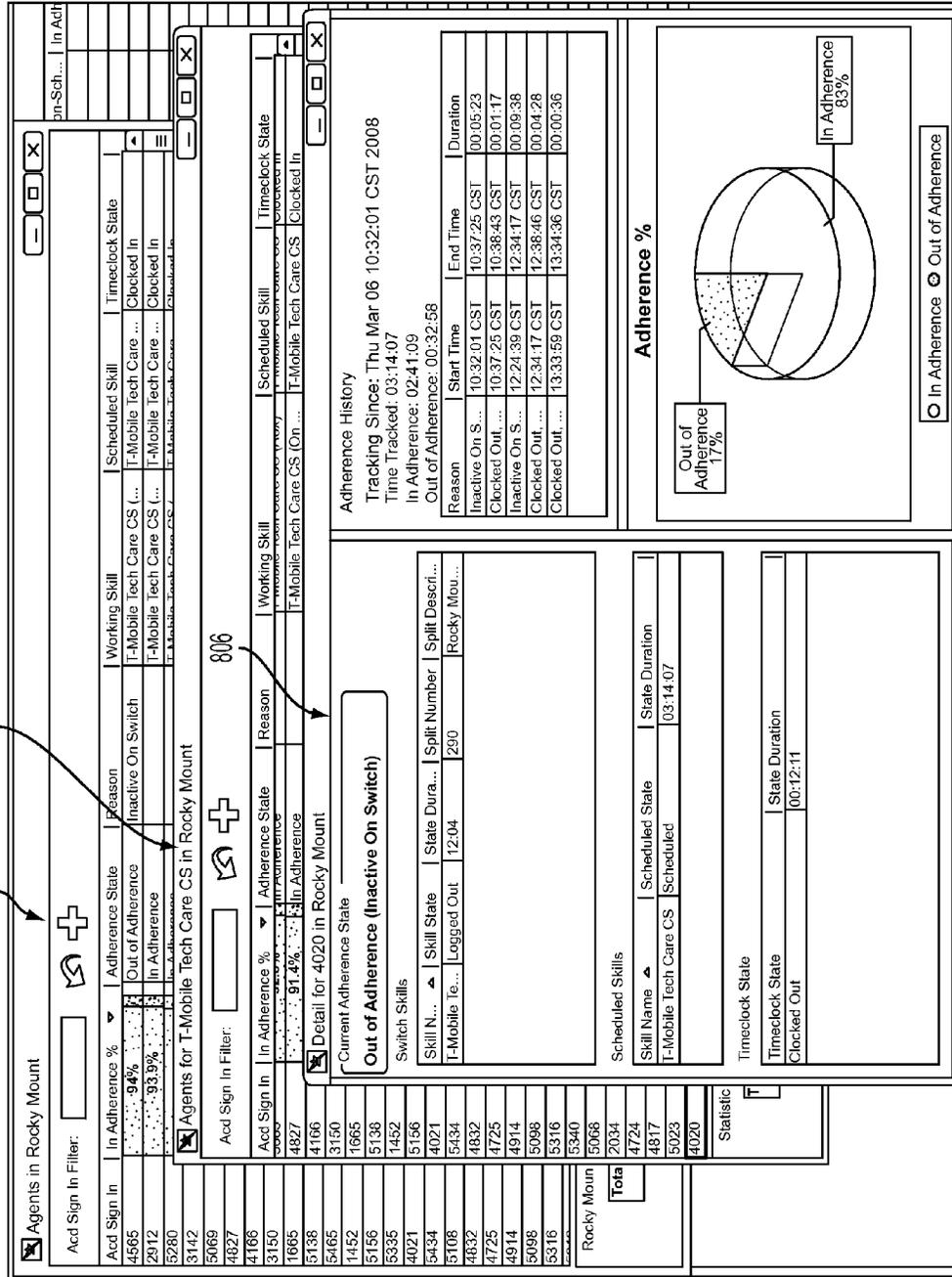
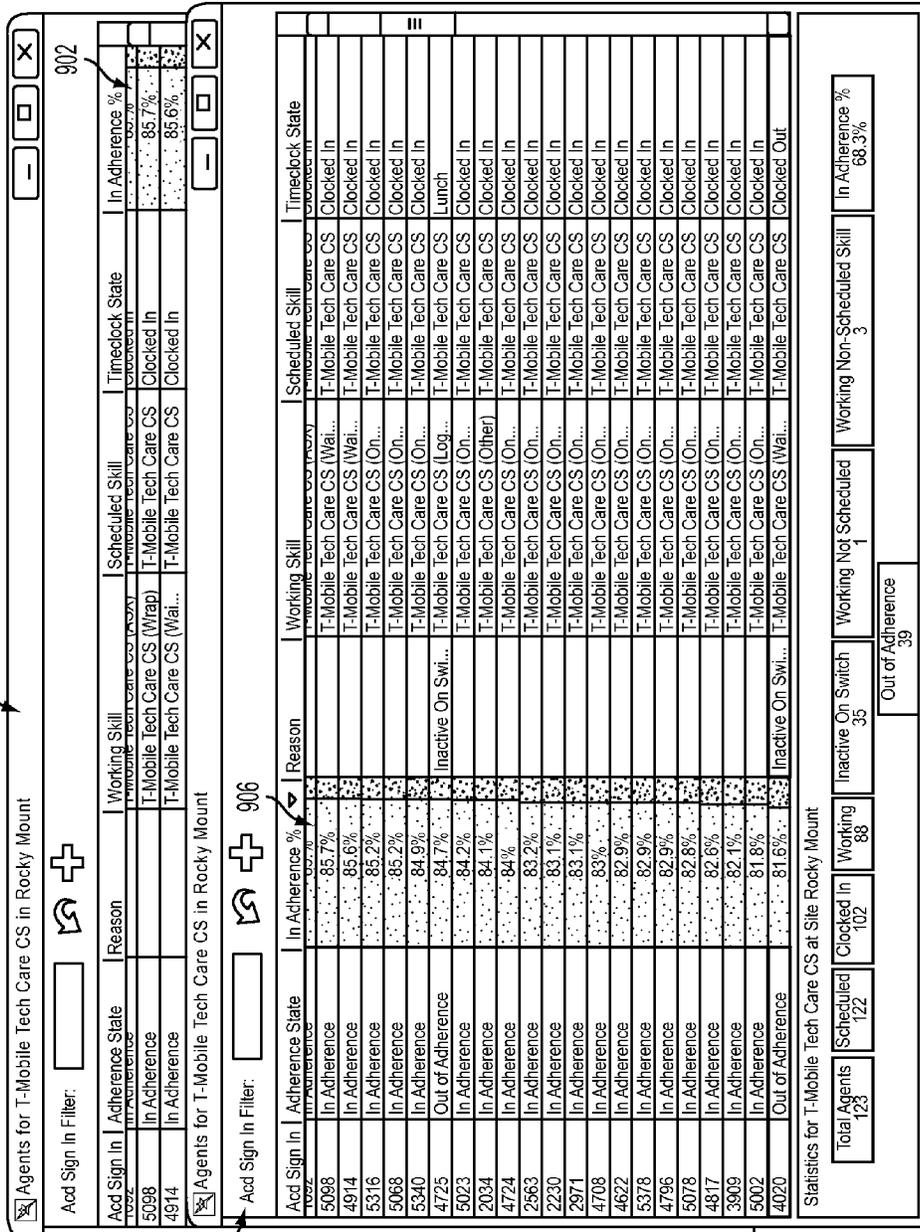


FIG. 8

900



904

FIG. 9

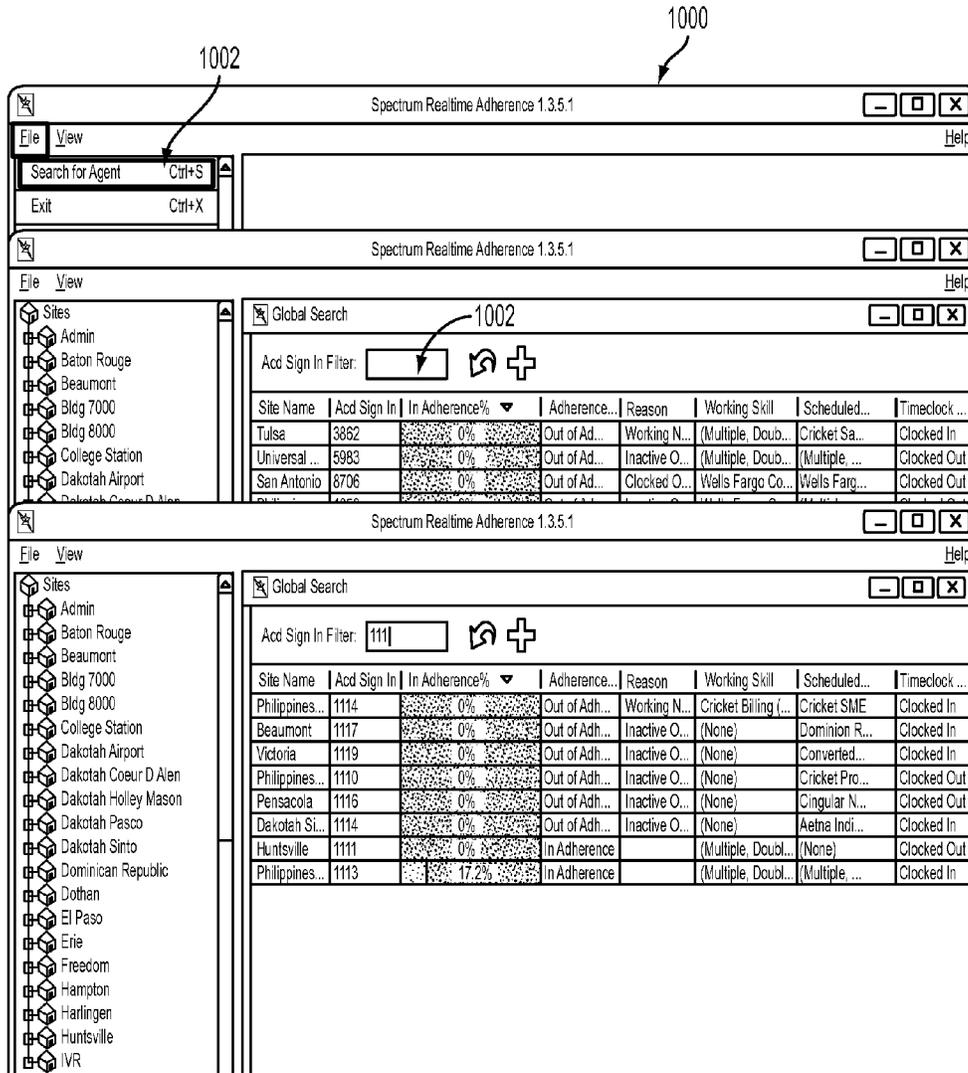


FIG. 10

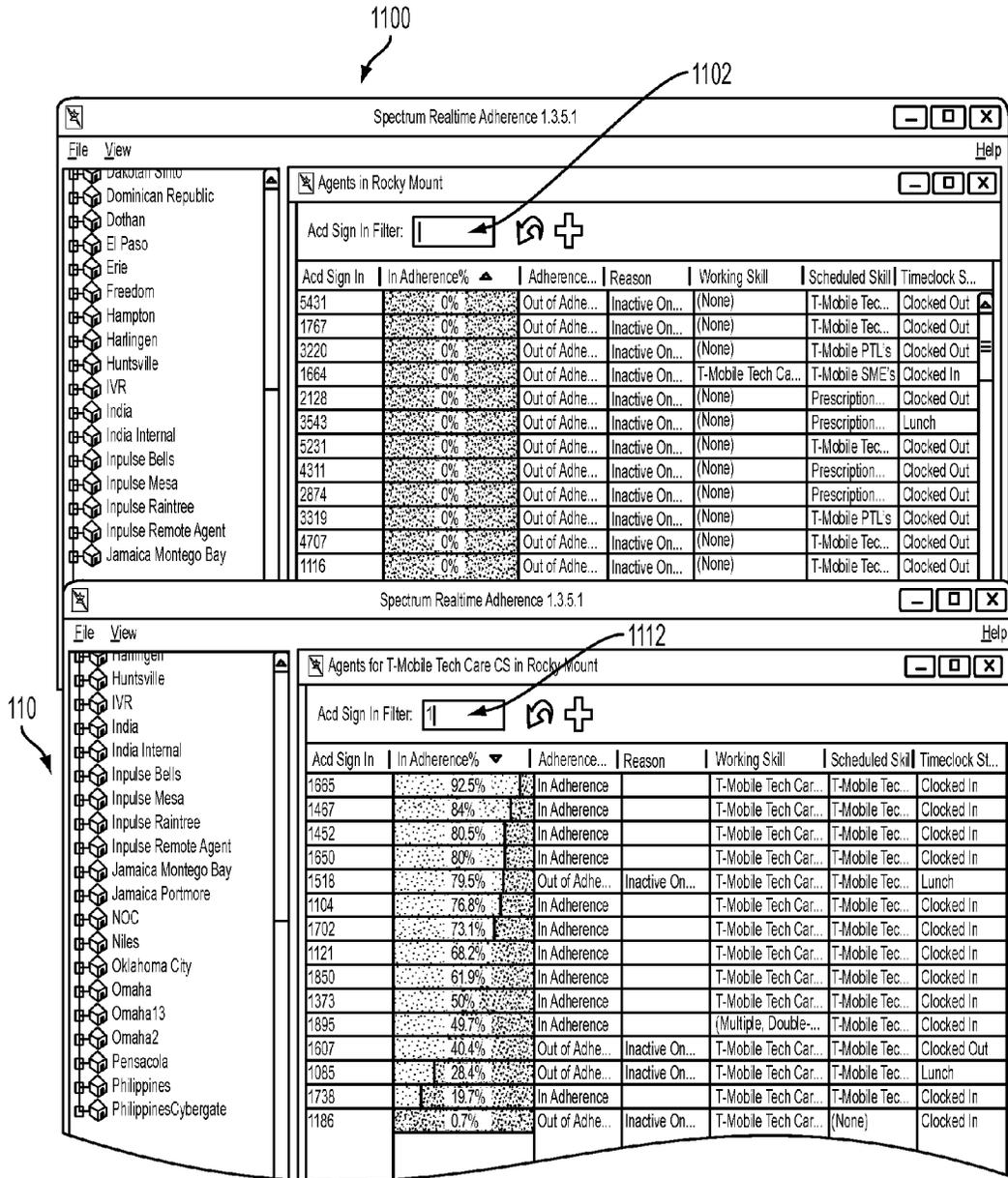


FIG. 11

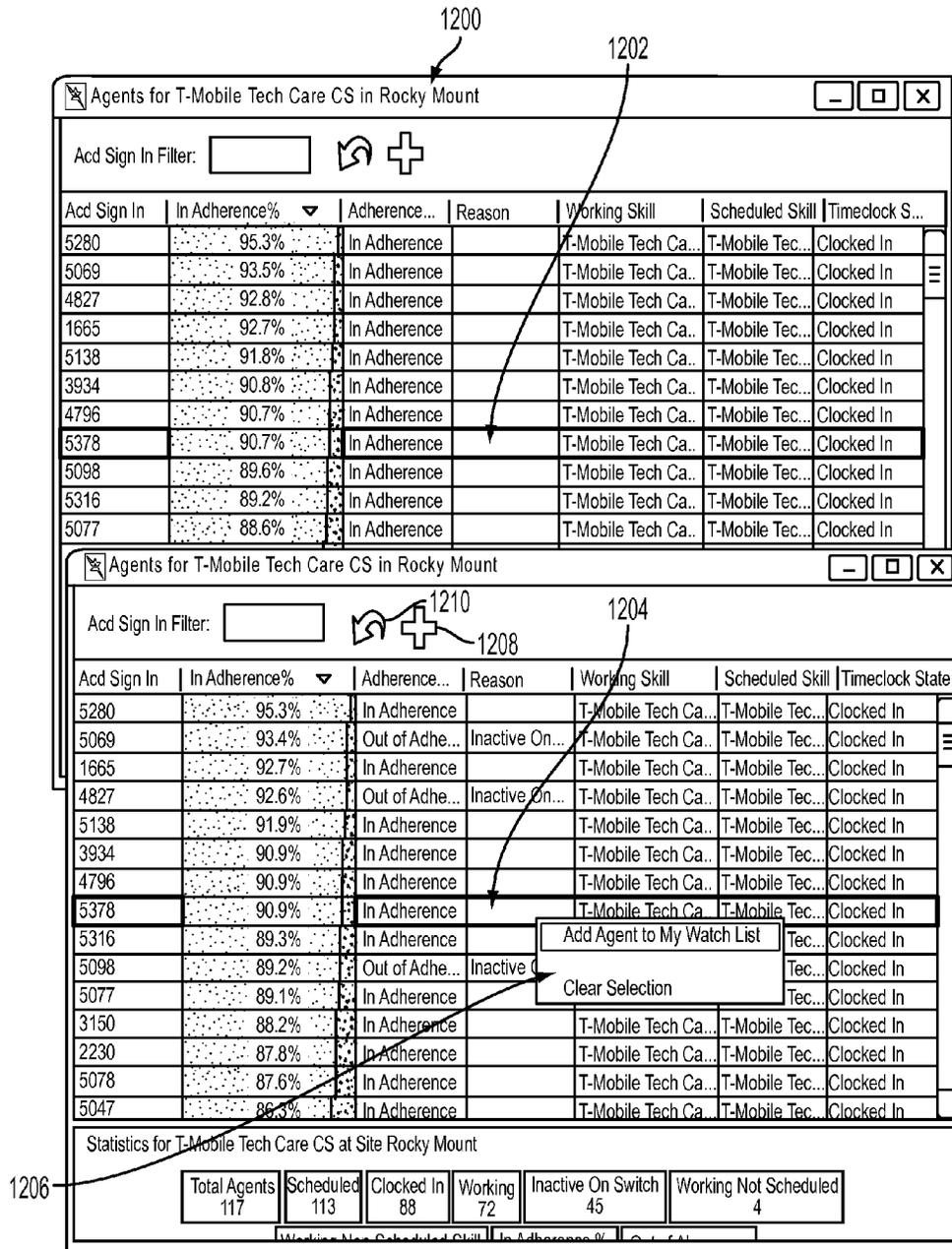


FIG. 12

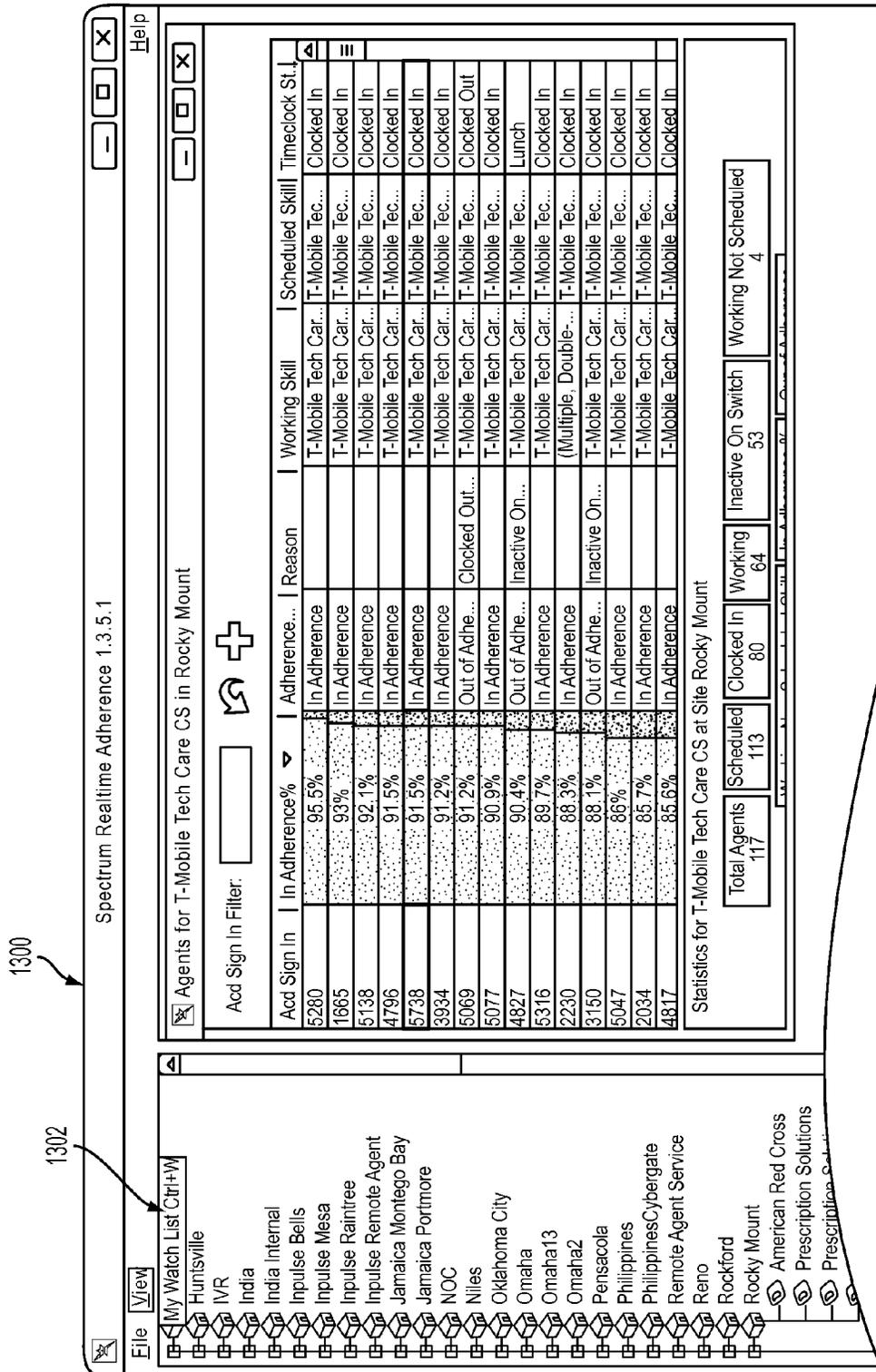


FIG. 13

1400

Active Agents in My Watch List

Acad Sign In Filter:

Site Name	Acad Sign In	In Adherence %	Adherence	Reason	Working Skill	Scheduled...	Timeclock...
Reno	5976	71.1%	Out of Adh...	Inactive O...	(Multiple, Doubl...	Cingular BE...	Lunch
College Sta...	3603	73.1%	In Adherence		Amex TSC Agen...	Amex TSC...	Clocked In
College Sta...	3760	75.3%	In Adherence		Amex TSC Agen...	Amex TSC...	Clocked In
College Sta...	3741	81.3%	In Adherence		Amex TSC Agen...	Amex TSC...	Clocked In

1402

1406

Active Agents in My Watch List

Acad Sign In Filter:

Site Name	Acad Sign In	In Adherence %	Adherence	Reason	Working Skill	Scheduled...	Timeclock...
Reno	5976	71.1%	Out of Adh...	Inactive O...	(Multiple, Doubl...	Cingular BE...	Lunch
College Sta...	3603	73.2%	In Adherence		Amex TSC Agen...	Amex TSC...	Clocked In
College Sta...	3760	75.4%	In Adherence		Amex TSC Agen...	Amex TSC...	Clocked In
College Sta...	3741	81.1%	In Adherence		Amex TSC Agen...	Amex TSC...	Clocked In

Remove Agent From My Watch List

Clear Selection

FIG. 14

1502

Active Agents In My Watch List
[-] [X]

Acad Sign In Filter:

Site Name	Acad Sign In	In Adherence%	Adherenc...	Reason	Working Skill	Scheduled...	Timeclock...
Reno	5976	41.4%	Out of Adh...	Inactive O...	(Multiple, Doubl...	Cingular BE...	Lunch
College Sta...	3603	73.1%	In Adherence		Amex TSC Agen...	Amex TSC...	Clocked In
College Sta...	3760	75.3%	In Adherence		Amex TSC Agen...	Amex TSC...	Clocked In
College Sta...	3741	81.3%	In Adherence		Amex TSC Agen...	Amex TSC...	Clocked In

Detail for 3741 in College Station

Current Adherence

In Adherence

Reason	Start Time	End Time	Duration
Working Not Sch...	13:04:24 CST	13:04:30 CST	00:00:06
Clocked In But...	07:58:21 CST	07:58:30 CST	00:00:08
Working Not Sch...	07:58:30 CST	08:01:56 CST	00:03:24
Inactive On Switch	09:19:28 CST	09:28:13 CST	00:08:45
Inactive On Switch	10:02:15 CST	10:13:50 CST	00:11:34
Inactive On Switch	10:59:29 CST	11:04:14 CST	00:04:45
Inactive On Switch	12:00:36 CST	12:33:34 CST	00:32:54
Inactive On Switch	14:01:09 CST	14:14:24 CST	00:13:14
On Break But W...	14:14:24 CST	14:18:20 CST	00:01:56

Scheduled Skills

Skill N...	Scheduled...	State Dur...
Amex TSC...	Scheduled...	06:46:31

Timeclock State

Timeclock State	State Duration
Clocked In	00:32:06

Adherence History

Tracking Since: Thu Mar 06 07:58:21 CST 2008

Time Tracked: 08:50:05

In Adherence: 05:35:13

Out of Adherence: 01:14:51

Reason	Start Time	End Time	Duration
Working Not Sch...	13:04:24 CST	13:04:30 CST	00:00:06
Clocked In But...	07:58:21 CST	07:58:30 CST	00:00:08
Working Not Sch...	07:58:30 CST	08:01:56 CST	00:03:24
Inactive On Switch	09:19:28 CST	09:28:13 CST	00:08:45
Inactive On Switch	10:02:15 CST	10:13:50 CST	00:11:34
Inactive On Switch	10:59:29 CST	11:04:14 CST	00:04:45
Inactive On Switch	12:00:36 CST	12:33:34 CST	00:32:54
Inactive On Switch	14:01:09 CST	14:14:24 CST	00:13:14
On Break But W...	14:14:24 CST	14:18:20 CST	00:01:56

Adherence %

Out of Adherence 18%

In Adherence 82%

Legend: In Adherence, Out of Adherence

Agents in Oklahoma City

Agents in Oklahoma City	Watch List Notification for 4051 in Philippines
Agents in Oklahoma City	Agent 4051 at site Philippines is in your watch list and they have become active. This agent is currently out of adherence. Reason: Inactive On Switch

Spectrum Realtime Adherence 1.2.0

Agents in Oklahoma City

Agents in Oklahoma City	Watch List Notification for 4051 in Philippines
Agents in Oklahoma City	Agent 4051 at site Philippines is in your watch list and they have become active. This agent is currently out of adherence. Reason: Inactive On Switch

Agents in Oklahoma City

Agents in Oklahoma City	Watch List Notification for 4051 in Philippines
Agents in Oklahoma City	Agent 4051 at site Philippines is in your watch list and they have become active. This agent is currently out of adherence. Reason: Inactive On Switch

Agents in Oklahoma City

Agents in Oklahoma City	Watch List Notification for 4051 in Philippines
Agents in Oklahoma City	Agent 4051 at site Philippines is in your watch list and they have become active. This agent is currently out of adherence. Reason: Inactive On Switch

FIG. 15

1504

REAL-TIME MONITORING OF AGENT ADHERENCE

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation from U.S. patent application Ser. No. 12/125,344, filed May 22, 2008, and entitled REAL-TIME MONITORING OF AGENT ADHERENCE, which is related to U.S. patent application Ser. No. 12/125,363 entitled WORKFORCE MANAGEMENT FOR A WORK AT HOME WORKFORCE filed on May 22, 2008, the entire contents of each of which are incorporated by reference herein.

FIELD OF THE DISCLOSURE

The present disclosure relates generally to schedule adherence information. More particularly, the present disclosure provides a method, a system, and a computer readable medium comprising instructions for real-time monitoring of schedule adherence among a plurality of agents.

BACKGROUND OF THE DISCLOSURE

Historically, management of a large employee workforce has been a complex and time-consuming task. With regard to managing large groups of employees, it is often difficult to manage the schedule, phone status and time clock information of such employees. Especially in an environment where a large number of agents are employed, it is often difficult for management to determine the real-time status of the agents' schedule and time spent working on a task or on the phone.

In order to monitor schedule and time worked by the agents, the current state of art matches information from routing platforms to the schedule application and provides a view of agent statuses on the initial loading of the a Web browser. However, the presented information is not updated or refreshed once it was loaded on the Web browser. Thus, management can only identify issues associated with agent schedules and time worked in a retroactive and reactive manner. A need exists for real-time monitoring of agents' adherence to schedule and time worked, such that updated information may be delivered to management of the agents and issues may be resolved more quickly.

SUMMARY OF THE DISCLOSURE

A method, a system, and computer readable medium comprising instructions for real-time monitoring of agent adherence. In one embodiment, the method comprises collecting events and data for an agent from at least one phone call router, collecting schedule data from a scheduling system, collecting time keeping data from a time clock system, normalizing the events, data, utilizing a message broker for secure information transmission over the public internet, generating at least one user interface comprising normalized data, presenting at least one view of the at least one user interface to at least one application, and refreshing the at least one view with updated events and data.

In another embodiment, the system comprises at least one phone call router comprising events and data for at least one agent, a schedule system comprising scheduling data for the at least one agent, a time clock system comprising time management information for the at least one agent, a web application server for collecting the events, data, a real-time monitoring system for normalizing the events and data and

generating at least one user interface comprising normalized events and data, a message broker for secure information transmission over the public internet and presenting the normalized events and data to at least one user in the at least one user interface.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 depicts a diagram of a system for real-time monitoring of agent adherence in accordance with an embodiment of the disclosure;

FIG. 2 depicts a flowchart of a process for real-time monitoring of agent adherence in accordance with one embodiment of the present disclosure;

FIG. 3 depicts a diagram illustrating a display of details for all sites in accordance with one embodiment of the present disclosure;

FIG. 4 depicts a diagram illustrating a display of details for a particular site in accordance with one embodiment of the present disclosure;

FIG. 5 depicts a diagram illustrating a list of skills for a particular site in accordance with one embodiment of the present disclosure;

FIG. 6 depicts a diagram illustrating a list of agents for a particular skill in accordance with one embodiment of the present disclosure;

FIG. 7 depicts a diagram illustrating a list of details for a particular agent in accordance with one embodiment of the present disclosure;

FIG. 8 depicts a diagram illustrating a display comprising multiple sites, skills and agent details in accordance with one embodiment of the present disclosure;

FIG. 9 depicts a diagram illustrating displays before and after the order of columns is rearranged in accordance with one embodiment of the present disclosure;

FIG. 10 depicts a diagram illustrating a display to launch an agent search across all sites in accordance with one embodiment of the present disclosure;

FIG. 11 depicts a diagram illustrating a display to launch an agent search for a particular site or skill in accordance with one embodiment of the present disclosure;

FIG. 12 depicts a diagram illustrating a selected agent for monitoring in accordance with one embodiment of the present disclosure;

FIG. 13 depicts a diagram illustrating a selection to view a watch list in accordance with one embodiment of the present disclosure;

FIG. 14 depicts a diagram illustrating a watch list in accordance with one embodiment of the present disclosure; and

FIG. 15 depicts a diagram illustrating details of an agent in the watch list and agent notification in accordance with one embodiment of the present disclosure.

DETAILED DESCRIPTION OF THE INVENTION

With reference to the figures and in particular with reference to FIG. 1, a diagram of a system for real-time monitoring of agent adherence is depicted in accordance with an embodiment of the disclosure. System 100 comprises a real-time monitoring system 102 which collects data and events from multiple sources. In one embodiment, real-time monitoring system 102 collects events from multiple sources, including multiple agent phone routers 104 and the web application server 118 which collects data from the agent scheduling system 114, and timekeeping system 130.

Agent phone routers 104 provide phone states and skills of the agents to real-time monitoring system 122. An example of

phone state may be whether the agent is active or inactive on the switch. Agent skill information may include the skill name that the agent is currently taking calls for. Based on the phone states and skills, content management server 112 generates reports that include a list of current states and skills of all agents who are currently on the switch. Content management server 112 also updates the list of current states every ten seconds.

Real-time monitoring system 122 also collects events from time keeping system 130 through web application server 118. Time keeping information includes clocked-in data of agents as well as lunch and break information. The time keeping data may be refreshed up to 12 times an hour. In one embodiment, the clocked-in data indicates whether an agent is clocked in or out. If the agent is clocked out, the time keeping data also indicates whether the agent is out for break, for lunch, or sick.

Agent scheduling system 114 generates agent schedules based on previously created schedules, which are fetched from the web application server 118 by real-time monitoring system 122. In one embodiment the schedule data indicates when the agent is scheduled to arrive and begin work and when they are scheduled to end work and leave.

Upon collecting events from multiple sources, real-time monitoring system 122 normalizes different formats of the data and events using a server side process 122. Server side process 122 performs computations of events and data collected from the multiple sources. Real-time monitoring system 122 then supplies these events to message broker 102.

System 100 further comprises a message broker 102 that provides a view of real-time agent status to management. In one embodiment, message broker 102 provides Web user interfaces that are updated in real time with events from real-time monitoring system 122. Examples of Web user interfaces include desktop application user interface 125 and staff application user interface 126. Desktop application user interface 124 may comprise instructions independent of real-time monitoring system 122. Desktop application user interface 124 may be launched either from a link on the user's desktop or from a link in the staff application. Desktop application may comprise a set of rules for determining adherence of agents.

Systems 102, 114, 118, 122, and 130 may be a data processing system, such as a desktop computer, a laptop computer, a server or any other type of device capable of sending and receive information via a wired or wireless protocol. The transfer of information or data between real-time monitoring system 122, web application server 118, message broker 102, agent scheduling server 114, desktop application user interface 124, and staff application user interface 126 may be accomplished via at least one of a wireless protocol, a wired protocol and a combination of a wireless protocol and a wired protocol. The steps performed in this figure are performed by software, hardware, firmware, and/or the combination of software, hardware, and/or firmware.

In one embodiment, a view of real-time agent status may include headcounts, scheduled agents, clocked-in agents, and adherence state of the agents. The adherence state may be in adherence or out of adherence. In adherence means that the agent's working skills and/or clocked-in state match up to the schedule. Out of adherence means that the agent's working skills and/or clocked-in state does not match up to the schedule. There are various reasons why an agent may be out of adherence. For example, an agent may be inactive on a switch, active on the switch while he or she is not scheduled, active on the switch for a different number of skills than the ones he or she is scheduled for, and active on the switch for a wrong skill.

To determine whether an agent is in or out of adherence, real-time monitoring system 102 examines the clocked-in data from time keeping system and agent schedules from the agent scheduling system and determines whether the agent is clocked in to work as scheduled or clocked in to work but not scheduled. Alternatively, based on the clocked-in data and agent schedules, real-time monitoring system 102 also determines agents who are scheduled and clocked in and scheduled but not clocked in.

Referring to FIG. 2, a flowchart of a process for real-time monitoring of agent adherence is depicted in accordance with one embodiment of the present disclosure. In one embodiment, process 200 may be implemented in a computer readable medium comprising instructions executing within real-time monitoring system 102 and Web application server 122.

Process 200 begins at step 202 to collect events and data from multiple sources, including agent phone state router 104, agent skill router 106 via content management server 112, and other routers 108 and 110. Process 200 then continues to step 204 to collect agent schedule data from the scheduling system. Process 200 then continues to step 206 to collect time reporting data from time keeping system 130. The time reporting data may be reported by agent scheduling system 114 in agent schedules 116. Process 200 then continues to step 208 to normalize the collected events and data. The normalization of events and data may be performing using high performance computing server 122.

Process 200 then continues to step 210 to generate one or more user interface with the normalized data and events. In one embodiment, the one or more use interface may be one or more Web browser interface generated by the Web application server 122. Process 200 then continues to step 212 to present a view of user interface to one or more application. For example, Web application 122 may present a Web browser interface to staff application 126 or desktop application 124. Process 200 then completes at step 214 to refresh the user interface with updated events and data from real-time monitoring system 102. For example, real-time monitoring system 102 collects updates from multiple sources in real-time and routes new normalized data to Web application server 122. In turn, Web application server 122 generates new user interface with the new normalized data and present the user interface to the applications.

To present a view of real-time agent status to management, the user interface may comprise one or more level of displays. Each level of displays may represent a different level of details. For example, one level of displays may include details for a particular site, another level of displays may include details for skills in a particular site, another level of displays may include details for a particular agent, and another level of display for monitoring agents.

Referring to FIG. 3, a diagram illustrating a display of details for all sites is depicted in accordance with one embodiment of the present disclosure. In one embodiment, display 300 may be implemented as a user interface executing within desktop application 124 when a manager launches desktop application 124 on the desktop. Also in one embodiment, the desktop application 124 may be executed on a Java® 1.6 runtime environment. Java® 1.6 runtime environment is a product from Sun Microsystems, Inc.

In display 300, a list of sites is presented in both a drop down list 301 and in column 302. For each site in the list of sites 302, a number of details are displayed. The details include the number of total agents 304, the number of agents scheduled 306, the number of agents clocked in 308, the number of agents currently working 310, the number of agents inactive on the switch 312, the number of agents who

are working but not scheduled **314**, the number of agents who are working the wrong skill **316**, the adherence percentage **320**, and the number of agents who are out of adherence **322**.

The number of total agent **304** is the total number of unique agents for each site from the switch, schedules, and time clock information. The number of agents scheduled **306** is the total number of active schedules from the agent time reporting server. The number of agents clocked in **308** is the total number of agents clocked in to the time keeping system **130**. The number of agents currently working **310** is the total number of agents on the switch for that site.

The number of agents inactive on the switch **312** includes agents who are scheduled for a skill but have not been active on the switch. The number of agents who are working but not scheduled **314** includes agents who are not scheduled by are active on the switch. The number of agents who are working the wrong skill **316** is determined by comparing the skill names that agents are active on the switch for to the skill names they are scheduled for.

The adherence percentage **320** is calculated based on the number of agents in adherence over the number of total agents **304**. In order to determine the number of agents in adherence, the number of agents out of adherence **322** is subtracted from the number of total agents **304**.

If the user selects one of the sites from drop down list **301** or the list of sites **302**, a display of details for the particular site is displayed. Referring to FIG. 4, a diagram illustrating a display of details for a particular site is depicted in accordance with one embodiment of the present disclosure.

Display **400** comprises details for all agents who are working for a particular site. A list of agents for this site is displayed in column **402**. In addition, display **400** comprises details for each agent in the list of agents **302**. These details include the percentage of adherence **404**, the current adherence state **406**, the reason for not being in adherence **408**, the working skill of the agent **410**, the scheduled skill of the agent **412**, and the time clock state of the agent **414**.

The reason for not being in adherence **408** may provide a user the ability to quickly tell what the agent is doing that is incorrect. The working skill **410** is a skill name obtained from agent skill phone call router **104**. The scheduled skill **412** is a skill name obtained from the scheduling system. The time clock state of the agent **414** is the clock state from time keeping system **130**.

In addition to details for each agent of the site, display **400** comprises real-time statistics for each site **416**. These statistics **416** include the number of total agents **418**, the number of agents scheduled **420**, the number of agents clocked-in **422**, the number of working agents **424**, the number of agents who are inactive on the switch **426**, the number of agents who are working but not scheduled **428**, the number of agents who are working the wrong skill **430**, the percentage of in adherence **434**, and the number of agents out of adherence **436**.

Referring to FIG. 5, a diagram illustrating a list of skills for a particular site is depicted in accordance with one embodiment of the present disclosure. Display **500** is similar to display **400** except that when a user clicks on a particular site from drop down list **301** or double clicks a site from a list of sites **502**, a list of skills **504** for that site is displayed.

Referring to FIG. 6, a diagram illustrating a list of agents for a particular skill is depicted in accordance with one embodiment of the present disclosure. Display **600** is similar to display **400** except that the list of agents **602** is for a particular skill. For each of the agents, details of their skills are displayed. These details include the adherence state, which is whether the agent is in adherence or out of adherence. The details also include reasons for being out of adher-

ence, including the number of agents inactive on the switch, working but not scheduled, working and schedule mismatch, working the wrong skill, clocked in but not working and not scheduled, on break but working, at lunch but working and clocked out but scheduled and working. The details further comprise the percentage of adherence, the working skill, the scheduled skill, and the clocked in state.

The clocked in but not working and not scheduled includes agents who are clocked in according to the time keeping system but are not active on the switch or on the schedule. On break but working includes agents who are on break but are active on the switch. At lunch but working includes agent who are on lunch but are active on the switch. Clocked out but scheduled and working includes agents who are clocked out but are active on the switch and have an active schedule.

Referring to FIG. 7, a diagram illustrating a list of details for a particular agent is depicted in accordance with one embodiment of the present disclosure. When the user selects an agent from a list of agents **602** or **402**, a display **700** of details for the selected agent is displayed. Display **700** comprises details for a particular agent. In this example, the details include switch skills **702**, scheduled skills **704**, time clock state **706**, and adherence history **708**.

Switch skills **702** include skill name **710**, skill state **712**, state duration **714**, split number **716**, and split description **718**. Skill name **710** is the name of the skill from the switch. Skill state **712** is the status of the agent on the switch, which may be logged out, on call, busy other, wrap, waiting, and not ready. State Duration **714** is the amount of time that the agent has spent in that state. Split number **716** is the split number from the switch. This number may be useful to any user in network control. Split description **718** is the description of the split number. This description may be useful to any user in network control.

Scheduled skills **704** include skill name **720**, scheduled state **722**, and state duration **724**. The skill name **720** describes the name of the skill from the scheduling system. The scheduled state **722** may either be scheduled or not scheduled. State duration **724** is the amount of time the agent has spent in that schedule duration.

Time clock state **706** includes time clock status **726**, and state duration **728**. The timeclock state **726** indicates the agent's current status on the timekeeping system. State Duration **728** is the amount of time that the agent has spent in that timeclock state. The time clock may be obtained from the agent's system and the time clock information may be updated twelve times an hour. The time clock state **728** may be clocked in, clocked out, and lunch and break.

Adherence history **708** include the agent's tracking since **728**, time tracked **730**, in adherence **732**, and out of adherence **734**. Tracking since **728** indicates the date and time the system began tracking or when the agent became active on the switch, scheduled or clocked in. Time tracked **730** indicates the amount of time the agent has been tracked. In adherence **732** indicates the amount of time the agent has been in adherence. Out of adherence **734** indicates the amount of time the agent has been out of adherence.

In addition, adherence history **708** includes reasons **736** for being out of adherence, which may include inactive on the switch, working but not scheduled and working the wrong skill. For each of these reasons, a start time, an end time, and the duration of time the agent was out of adherence for the reason listed are also displayed.

Adherence history **708** also includes adherence % **738**. Adherence % is a graphical display of the amount of time tracked separated in a pie-chart format into the amount of

time out of adherence and amount of time in adherence. This includes labels **740** and a key **742**.

In addition to displaying a view of details for a particular site, an agent, or a skill to management, multiple sites or skills may be displayed at one time by selecting each site or skill individually. Referring to FIG. **8**, a diagram illustrating a display comprising a site view, a skill view agent details is depicted in accordance with one embodiment of the present disclosure. Display **800** comprises details for one site **802**, details for a skill **804**, and details for a particular agent **806**.

In any of the displays described above, sorting of data in each column may be performed by clicking on the header row of each column. For example, to sort the percentage of adherence for a list of agents, the user may click on the header row "adherence %" to view a sorted list.

Also, in any of the displays described above, the order of columns in each display may be rearranged. Referring to FIG. **9**, a diagram illustrating displays before and after the order of columns is rearranged is depicted in accordance with one embodiment of the present disclosure. Display **900** comprises details for a particular skill. A user may decide to rearrange the in adherence % column **902** in display **900**. The user may click on in adherence % column **902** and drag the column to a different order. In this example, the in adherence % column **902** is rearranged from the sixth column to the third column **906** as illustrated in display **904**.

Another aspect of the desktop application **124** includes providing management the ability to locate and monitor agents. Referring to FIG. **10**, a diagram illustrating a display to launch an agent search across all sites is depicted in accordance with one embodiment of the present disclosure. To launch a global search, a user may select the file menu in display **1000** and search for agent option **1002** from the file menu or use the keyboard shortcut of CTRL+S. A global search of agent across all sites may be performed once the user enters an agent number into an agent sign in filter field **1002**.

In addition to an agent search across all sites, an agent search may be performed for a specific site or skill. Referring to FIG. **11**, a diagram illustrating a display to launch an agent search for a particular site or skill is depicted in accordance with one embodiment of the present disclosure. Display **1100** includes details for a particular site, in this example, Rocky Mount. A user may perform an agent search for this particular site by entering an agent number into the agent sign in filter field **1102**. Similarly, display **1110** includes details for a particular skill, in this case T-Mobile Tech Care CS. A user may perform an agent search for this particular skill by entering an agent number into the agent sign in field **1112**.

Because the displays are continuously refreshed by real-time monitoring system as new events and data are processed, a user may keep monitoring the status of the agent by selecting the agent. Referring to FIG. **12**, a diagram illustrating a selected agent for monitoring is depicted in accordance with one embodiment of the present disclosure. To select an agent for monitoring, a user may highlight the agent row to keep that agent in front view as the system updates and sorts the data by state. In display **1200**, a user may select the agent by highlighting the agent row **1202**. The user may then right click the selected row and select "add agent to my watch list" **1204** to add that agent for monitoring. To deselect an agent from monitoring, the user may right click on the selected row and select "clear selected row" **1206** to remove the agent from highlighting.

Additionally a user may add an agent to the watch list using the add agent to my watch list button **1208**, or clear the row with the row selected row button **1210**. The add agent to

watch list **1208** appears when a row is highlighted, depression of the button adds the selected agent to the watch list. The row clear button **1210** deselects the row.

Once agents are added to the watch list, a user may view the list of watched agents by customizing a view. Referring to FIG. **13**, a diagram illustrating a selection to view a watch list is depicted in accordance with one embodiment of the present disclosure. To view agents who have been added to the watch list, a user may select a view menu in display **1300** and "my watch list" option **1302** from the view menu, or use the keyboard shortcut CTRL-W.

Upon selection of the "my watch list" option **1302**, a display comprising agents in the watch list is displayed. Referring to FIG. **14**, a diagram illustrating a watch list is depicted in accordance with one embodiment of the present disclosure. Display **1400** comprises all active agents that are added to the watch list. In this example, agents **4976**, **3603**, **3760** and **3741** have been added to the watch list. By providing the ability to monitor agents in a watch list, agents that have a history of out of adherence may be monitored. The watch list may be saved for different users. Thus, the watch list may be retrieved and displayed to any user the next time the user logs on to the application.

The list of agents in a watch list will remain on the list until the user removes them. To remove an agent from the watch list, the user may select the agent to be removed and right click on the agent row. The user may then select "remove agent from my watchlist" to remove the selected agent. For example, in display **1402**, the user may select agent number **4742** to be removed. Then the user may right click on the agent row and select "remove agent from my watch list" **1404** to remove agent number **4742** from the watch list. A user can also use the "remove agent from my watch list" button **1406**.

If the user wants to view details for an agent in the watch list, the user may double click on the agent to view the details. Referring to FIG. **15**, a diagram illustrating details of an agent in the watch list and agent notification is depicted in accordance with one embodiment of the present disclosure. A user may view details of an agent in the watch list by double clicking an agent from the list. In this example, agent number **3741** is added to watch list in display **1502**. By double clicking agent number **3741** in display **1502**, a display of details is displayed. If the agent becomes active, a notification **1506** may be displayed notifying the user that the agent in the watch list has become active. In addition, the notification **1506** may notify the user that the agent is currently out of adherence and the reason for being out of adherence, in this example, inactive on switch. Notification **1506** also provides options for the user to close the notification or to show the details of the agent.

In summary, the present disclosure provides real-time monitoring of agent adherence to a work schedule. Data and events, including events from call router, time clock information and schedule events, are collected from multiple sources and normalized. A view of details for sites, skills, and agents are provided to management via a Web user interface and refreshed at real time to provide updated schedule adherence information.

Although the above descriptions set forth preferred embodiments, it will be understood that there is no intent to limit the embodiment of the disclosure by such disclosure, but rather, it is intended to cover all modifications, substitutions, and alternate implementations falling within the spirit and scope of the embodiment of the disclosure. The embodiments are intended to cover capabilities and concepts whether they be via a loosely coupled set of components or they be con-

verged into one or more integrated components, devices, circuits, and/or software programs.

What is claimed is:

1. A method, comprising:

collecting, by a web application server of a real-time monitoring system, events and data for an agent from a scheduling system and a phone router;

collecting, by a server of the real-time monitoring system, events and data for the agent from the phone router, wherein the phone router comprises a phone skill name that the agent is currently taking calls for and comprises a state of the agent's phone at that time, the state of the agent's phone comprising active or inactive on the phone router, the phone skill name comprising a skill name the agent is currently working;

collecting, by the web application server of the real-time monitoring system, time keeping events and data from a time keeping system, the time keeping data comprising clocked-in time, clocked-out time, lunch time and break time, the time keeping events comprising whether the agent is out on break, on lunch or sick;

normalizing the events, data, the time keeping data of multiple data formats and generating normalized data and at least one user interface comprising the normalized data, by a server side process of the real-time monitoring system; and

wherein the at least one user interface is one of a staff application user interface and a desktop application user interface;

providing the normalized data to a message broker of the real-time monitoring system;

presenting, by the message broker, at least one view of the at least one user interface of the normalized events and data to one of the staff application user interface and the desktop application user interface;

wherein the display of details for the particular skill of the at least one agent comprises details of the at least one agent for the particular skill, and wherein the details comprise an adherence state, a reason for being out of adherence, an adherence percentage, and a working skill;

wherein the reason for being out of adherence comprises a number of agents inactive on the switch, working but not scheduled, working and schedule mismatch, working the wrong skill, clocked in but not working and not scheduled, on break but working, at lunch but working and clocked out but scheduled;

wherein the display of details for a particular agent comprises working skills of the particular agent, and adherence history of the particular agent; and

periodically fetching the events and data from the phone router, including a change to at least one of the phone skill name that the agent is currently taking calls for and a change to the phone state of the agent;

wherein the at least one view comprises: at least one level of display, wherein the at least one level of display includes a display of details across a plurality of sites, a display of details for a particular site, a display of details for a particular skill, and a display of details for a particular agent; and

wherein the display of details for the particular site comprises details of at least one agent in the particular site, wherein the details comprises an adherence percentage, a reason for not being in adherence, a working skill of the at least one agent, a scheduled skill of the at least one agent, a time clock state of the at least one agent, real-time statistics for the particular site, the real-time statis-

tics comprise a number of total agents, a number of agents scheduled, a number of agents clocked-in, a number of working agents, a number of agents who are inactive on a switch, a number of agents who are working but not scheduled, a number of agents who are working a wrong skill, a percentage of agents in adherence, and a number of agents out of adherence.

2. The method of claim 1, wherein the phone skill that the agent is currently taking calls for is also referred to as a working skill and wherein a phone skill name that the agent is currently scheduled to take calls for is also referred to as a scheduled skill.

3. The method of claim 2, wherein non-adherence by the agent is indicated when the working skill differs from the scheduled skill.

4. The method of claim 1, wherein the scheduling system generates at least one schedule for an agent.

5. The method of claim 1, wherein normalizing the events, data, time keeping data comprises computing the event, data, and time keeping data in a high performance computing server.

6. The method of claim 1, wherein the at least one view comprises at least one level of display, wherein the at least one level of display includes a display of details across a plurality of sites, a display of details for a particular site, a display of details for a particular skill, and a display of details for a particular agent.

7. The method of claim 1, wherein the adherence percentage is calculated by dividing the number of agents who are in adherence over the number of total agents and multiplying the result by 100.

8. The method of claim 7, wherein the number of agents who are in adherence is calculated by subtracting the number of agents who are out of adherence from the number of total agents.

9. The method of claim 1, further comprises locating and monitoring at least one agent.

10. The method of claim 9, wherein locating at least one agent comprises performing a search for at least one agent across a plurality of sites, in a particular site, or for a particular skill.

11. The method of claim 9, wherein monitoring at least one agent

comprises at least one of: adding at least one agent to a watch list;

selecting an agent from the at least one agent; viewing details of the agent in the at least one view; and

notifying the at least one user in response to the at least one agent in the watch list one of initially becoming active on a switch, initially being scheduled, and exhibiting an initial time clock state other than Logged Out.

12. A system, comprising:

a Web application server, collecting events and data for an agent from a scheduling system; the web application server, collecting time keeping events and time keeping data from a time keeping system, the time keeping data comprising clocked-in time, clocked-out time, lunch time and break time, the time keeping events comprising whether the agent is out on break, on lunch or sick;

a server, collecting events and data for the agent from at least one phone router wherein the at least one phone router comprises a phone skill name that the agent is currently taking calls for and comprises a state of the agent's phone at that time, the state of the agent's phone comprising active or inactive on the at least one phone router, the phone skill name comprising a skill name the agent is currently working; a high performance comput-

11

ing system, normalizing the events, data, the time keeping data and generating normalized data and at least one user interface comprising the normalized data;

wherein the at least one user interface is one of a staff application user interface and a desktop application user interface;

providing the normalized data to a message broker; the message broker, presenting at least one view of the at least one user interface to one of the staff application user interface and the desktop application user interface;

wherein the at least one view comprises: at least one level of display, wherein the at least one level of display includes a display of details across a plurality of sites, a display of details for a particular site, a display of details for a particular skill, and a display of details for a particular agent;

wherein the display of details for the particular site comprises details of at least one agent in the particular site, wherein the details comprises an adherence percentage, a reason for not being in adherence, a working skill of the at least one agent, a scheduled skill of the at least one agent, a time clock state of the at least one agent, real-time statistics for the particular site, the real-time statistics comprise a number of total agents, a number of agents scheduled, a number of agents clocked-in, a number of working agents, a number of agents who are inactive on a switch, a number of agents who are working but not scheduled, a number of agents who are working a wrong skill, a percentage of agents in adherence, and a number of agents out of adherence;

wherein the display of details for the particular skill of the at least one agent comprises details of the at least one agent for the particular skill, and wherein the details comprise an adherence state, a reason for being out of adherence, an adherence percentage, and a working skill;

wherein the reason for being out of adherence comprises a number of agents inactive on the switch, working but not scheduled, working and schedule mismatch, working the wrong skill, clocked in but not working and not scheduled, on break but working, at lunch but working and clocked out but scheduled;

wherein the display of details for a particular agent comprises working skills of the particular agent, and adherence history of the particular agent; and

the web application server, periodically fetching the events and data from the phone router, including a change to at least one of the phone skill name that the agent is currently taking calls for and a change to the phone state of the agent.

13. A non-transitory computer readable storage medium comprising instructions that, when executed by a processor, perform:

collecting, by a web application server of a real-time monitoring system, events and data for an agent from a scheduling system;

collecting, by a server of the real-time monitoring system, events and data for the agent from at least one phone router wherein the at least one phone router comprises a phone skill name that the agent is currently taking calls for and comprises the state of the agent's phone at that time, the state of the agent's phone comprising active or

12

inactive on the at least one phone router, the phone skill name comprising a skill name the agent is currently working;

collecting, by the web application server of the real-time monitoring system, time keeping events and data from a time keeping system, the time keeping data comprising clocked-in time, clocked-out time, lunch time and break time, the time keeping events comprising whether the agent is out on break, on lunch or sick;

normalizing the events, data, the time keeping data and generating normalized data and at least one user interface comprising the normalized data, by a server side process of the real-time monitoring system;

wherein the at least one user interface is one of a staff application user interface and a desktop application user interface;

providing the normalized data to a message broker of the real-time monitoring system;

presenting, by the message broker, at least one view of the at least one user interface to one of the staff application user interface and the desktop application user interface;

wherein the at least one view comprises: at least one level of display, wherein the at least one level of display includes a display of details across a plurality of sites, a display of details for a particular site, a display of details for a particular skill, and a display of details for a particular agent;

wherein the display of details for the particular site comprises details of at least one agent in the particular site, wherein the details comprises an adherence percentage, a reason for not being in adherence, a working skill of the at least one agent, a scheduled skill of the at least one agent, a time clock state of the at least one agent, real-time statistics for the particular site, the real-time statistics comprise a number of total agents a number of agents scheduled, a number of agents clocked-in, a number of working agents, a number of agents who are inactive on a switch, a number of agents who are working but not scheduled, a number of agents who are working a wrong skill, a percentage of agents in adherence, and a number of agents out of adherence;

wherein the display of details for the particular skill of the at least one agent comprises details of the at least one agent for the particular skill, and wherein the details comprise an adherence state, a reason for being out of adherence, an adherence percentage, and a working skill;

wherein the reason for being out of adherence comprises a number of agents inactive on the switch, working but not scheduled, working and schedule mismatch, working the wrong skill, clocked in but not working and not scheduled, on break but working, at lunch but working and clocked out but scheduled;

wherein the display of details for a particular agent comprises working skills of the particular agent, and adherence history of the particular agent; and

periodically fetching the events and data from the phone router, including a change to at least one of the phone skill name that the agent is currently taking calls for and a change to the phone state of the agent.

* * * * *